



Assessing New England Coastal Wetlands Using a Systematic, Reference-based Approach

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Abstract

The US EPA, Atlantic Ecology Division is working collaboratively with EPA Region 1, Massachusetts Coastal Zone Management, the University of Rhode Island, Natural Resources Department, and Yale University, the School of Forestry and Environmental Studies to implement landscape and rapid assessments of coastal salt marshes in Rhode Island, Massachusetts, and Connecticut. Using a 3-tiered approach, the coastal wetlands are assessed with (1) a landscape analysis (2) a field, rapid method, and (3) a detailed field evaluation for some targeted sites. The landscape analysis (tier 1) uses National Wetland Inventory maps of intertidal, emergent and associated wetlands, aerial photography, and a Geographic Information System to assess condition of the wetlands and disturbances (e.g., ditching, fragmentation) at a coarse scale. In the second assessment tier, the condition of the marsh is described through a field evaluation using measures of hydrology, plants, and soil. The plant metrics include descriptions of communities, species, and percent cover. Soil metrics include measures of penetration resistance and stable plant or peat fragment content in the surface layer of the soil. Area of disturbances such as tidal restrictions, outfalls, and invasive species are also observed on-site. In the final tier, detailed biological and geochemical measurements are made at a targeted subset of reference sites of low to high watershed disturbance as indicated by land use and nutrient inputs. Upon completion of the assessment, a reference-based evaluating scheme will be developed to describe the relative condition of the coastal wetlands.

Goal

To create a scientifically-based tool that can determine the condition of New England salt marshes in a rapid, cost effective manner.

Operational Definition

Condition is the state of an observed salt marsh in comparison to the state of a standard reference salt marsh with respect to its physical, chemical and biological attributes. For this study, condition is described by measures of plants, soils hydrology and the marsh landscape.

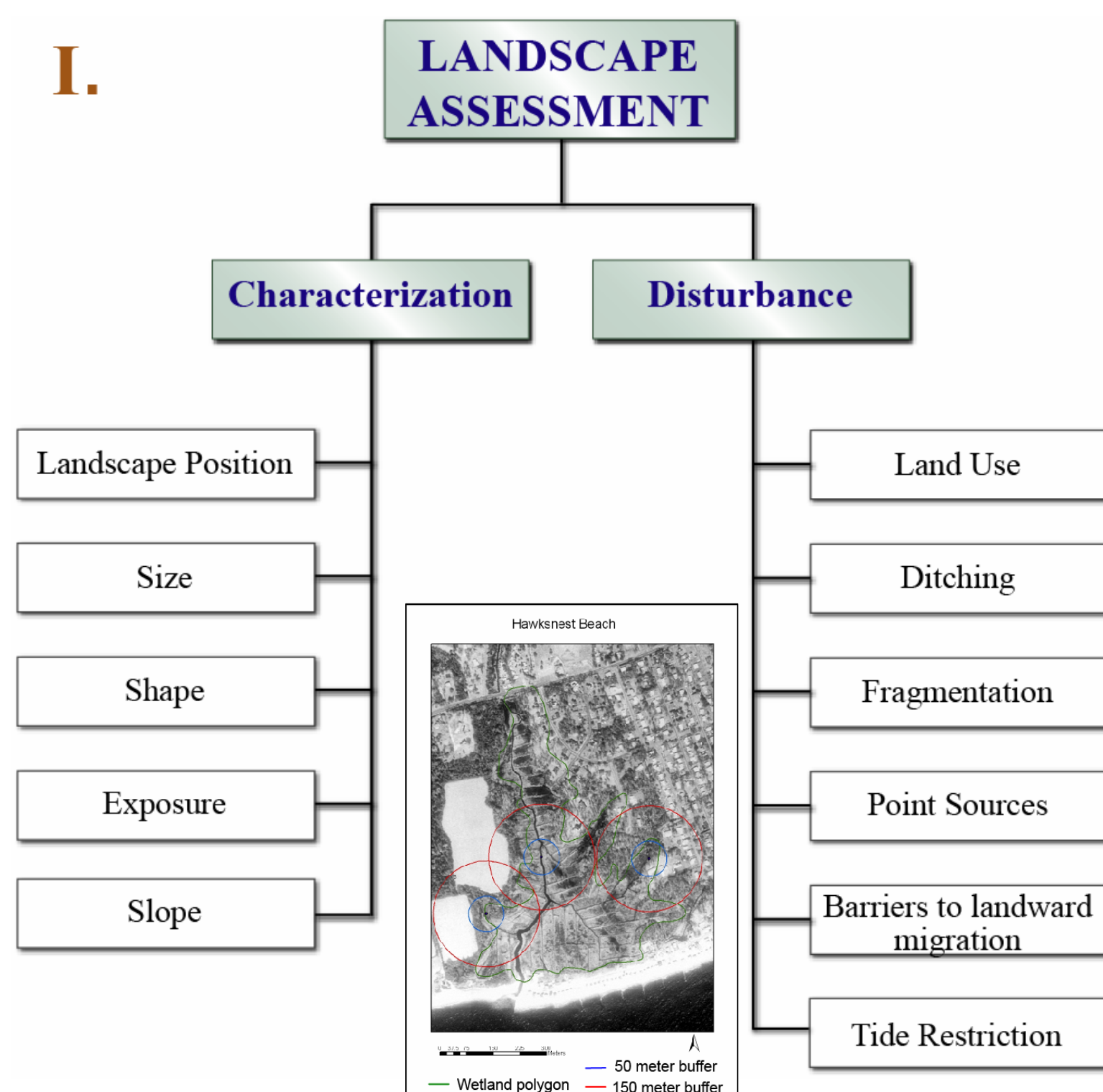
Summary of Approach

Objective I: Utilize Landscape Assessment to characterize New England salt marshes and identify disturbances

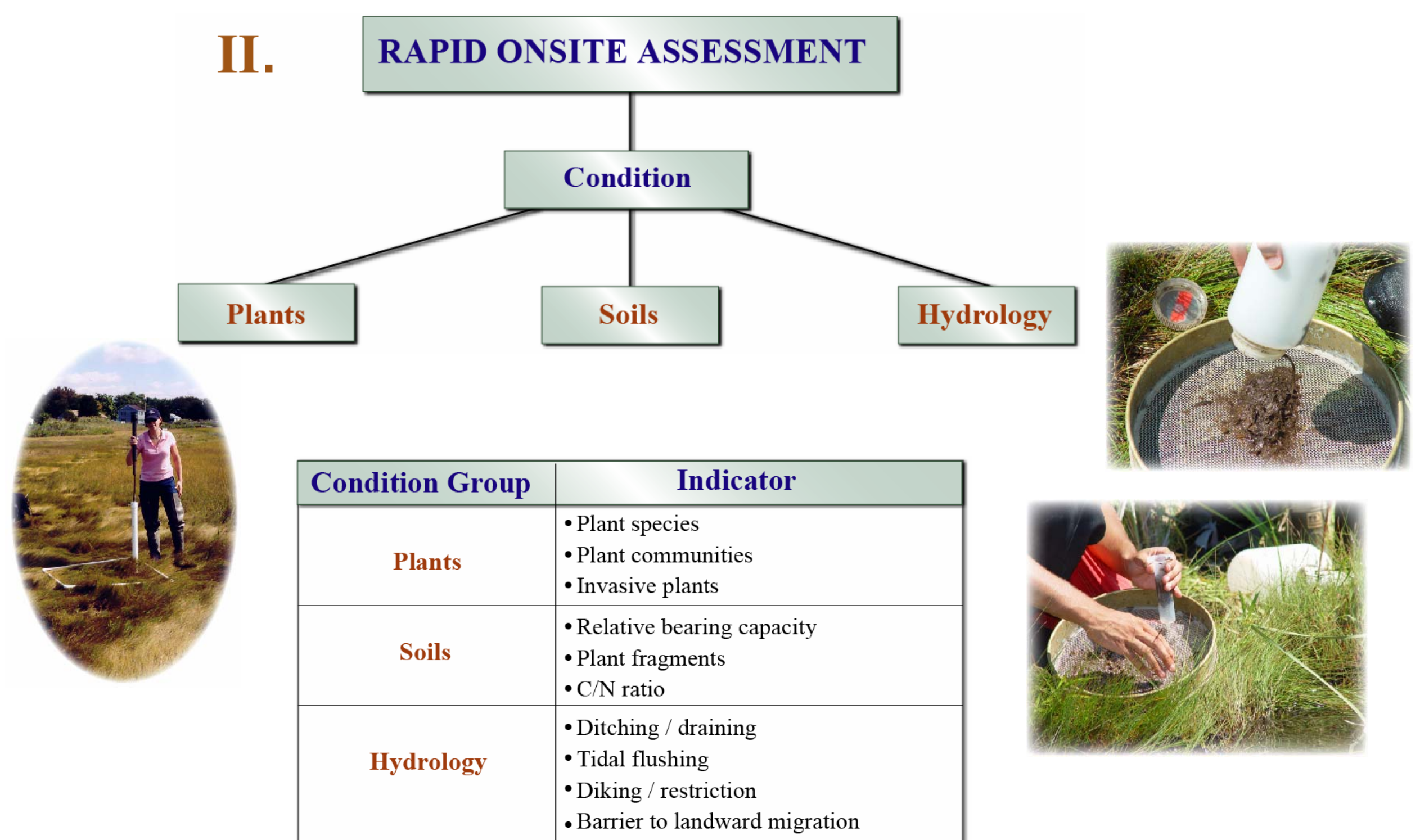
Objective II: Develop Rapid Assessment Indicators which determine present condition of New England salt marshes and conduct assessment

Objective III: Determine scoring system which will calculate a Condition Index to represent the overall condition of the New England salt marsh

I.



II.



Results

- Completed Landscape and Rapid Assessments at about 70 salt marshes across southern New England (CT, RI, MA)
- Currently conducting statistical analysis of data to establish relationships between selected indicators
- Will test if condition index is inversely proportional to watershed development and anthropogenic disturbances

Next Steps

- Complete data analysis, focusing on relationships between disturbance indicators and condition indicators
- Use this information to develop reference standard
- Create overall condition scoring system which will average the hydrology, vegetation, soil and marsh landscape metrics to yield the overall condition of the marsh

Additional Applications

- Compliance with Clean Water Act 305b "State of the Nations Waters" Report
- Monitoring coastal wetland mitigation and restoration projects
- Comparing coastal wetland condition among New England states
- Developing functional assessments based on condition
- Develop diagnostic tools to report salt marsh health

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